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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/775,590	02/09/2004	Wen-Chun Zheng	NLT-P103	5411
32566	7590	07/05/2006	EXAMINER	
PATENT LAW GROUP LLP 2635 NORTH FIRST STREET SUITE 223 SAN JOSE, CA 95134			BUI, HUNG S	
			ART UNIT	PAPER NUMBER
			2841	

DATE MAILED: 07/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/775,590

Applicant(s)

ZHENG, WEN-CHUN

Examiner

Hung S. Bui

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– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 21-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 and 21-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>02/09/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of claims 1-14 and 21-26 in the reply filed on 04/14/2006 is acknowledged.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Huang et al. [US 6,171,128].

Regarding claim 1, Huang et al. disclose an elastic socket (figures 1-2 and 9) for a land or Ball Grid Array (LGA/BGA) package, comprising:

- an insulative board (2) defining one or more matrices of housing openings (holes which are holding conductive contacts 210, figure 1) and a plurality of holes (22) proximate to edges of the insulative board;
- a plurality of metal contacts (210, figure 9) in the housing openings on the insulative board;

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- a laminate bonding layer applied on the insulative to fix the plurality of metal contacts (figures 1-2 and 9); and
- a plurality of alignment members (42) fitting in the plurality of holes on the insulative board for aligning the LGA/BGA package to the metal contacts.

Regarding claim 21, Huang et al. disclose the alignment members being selected from the group consisting of pins or spring clips (figures 1-2).

4. Claims 12 and 24-25 are rejected under 35 U.S.C. 102(e) as being anticipated by Cromwell et al. [US 6,930,884].

Regarding claims 12, 24-25, Cromwell et al. disclose an integrated circuit system (figure 1), comprising:

- a bolster plate (44);
- a printed circuit board (30);
- a LGA/BGA socket (52) mounted on the printed circuit board;
- a LGA/BGA package aligned with the LGA/BGA socket (figure 1);
- a frame (54) surrounding the LGA/BGA package; and
- a heat sink device (70) placed above the LGA/BGA package and the frame (figure 1), wherein the printed circuit board is sandwiched between the bolster plate and the frame using multiple fasteners (60), the frame provides increased stiffness to the subsystem, and the subsystem is secured with fasteners/screws through the heat transfer device, the frame, the printed circuit board and the bolster plate, so that the top of

the LGA/BGA package have tight contact with the bottom of the heat transfer device.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2-5 and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huang et al. in view of Cherian et al. [US 4,161,346] and Grabbe et al. [US 5,380,210].

Regarding claims 2 and 5, Huang et al. disclose the instant claimed invention except for the specific of the metal contacts.

Cherian et al. disclose a metal LGA socket contact (10, figures 1-3) having a top surface portion (30) for contacting a package pad (44), a curved plated spring portion (28) connected to the top surface portion, a contact wall portion (20, 24, 26) providing sliding contact with the curved plate spring portion and a printed circuit board contact portion (30, figure 1) and wherein the socket contact is resilient in a vertical direction of an antigravity which is created by a chip package weight (48) when it is mounted thereon the socket contact.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the contact design of Cherian et al. in the socket of Huang et

al., in order to provide a resilient and electrical contact between the chip package and the printed circuit board.

Grabbe et al. disclose an electrical contact (figures 2-5) having an electrical contact spring (22) with different widths (figures 3-4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the electrical contact spring design of Grabbe et al. for the contact of Cherian et al. in Huang et al. device, in order to provide more resiliency to the contact free end.

Regarding claim 3, Huang et al. disclose the top contact portion having a curve/concave shape and the bottom contact surface portion having a circular surface.

Huang et al. disclose the instant claimed invention except for the top contact surface portion having a spherical surface.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the top contact surface portion of Huang et al., that is the same the bottom contact surface shape of Huang et al., for the purpose of providing maximum contact area to solder the contact to the chip package.

Regarding claim 4, Huang et al., in view of Shirai et al., further disclose a solder ball (5) attached to a bottom contact portion to mount the socket to the printed circuit board (figure 9).

Regarding claims 22-23, Huang et al. disclose the instant claimed invention except for the contact being formed of specific material such as gold or copper alloys.

Cherian et al. disclose the contact being formed of gold.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use gold to make the electrical contact in Huang et al., as modified, as suggested by Cherian et al., for the purpose of proving better conductivity.

7. Claims 6 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cromwell et al. in view of Goodwin [US 6,545,879].

Regarding claims 6 and 26, Cromwell et al. disclose the subsystem assembly, the LGA/BGA package including a semiconductor chip (20) and a thin layer (53) of heat spreader having a very high in plane or isotropic thermal conductivity adhered to a top side of the semiconductor chip and the heat spreader spreading heat from hot spots on the semiconductor chip.

Cromwell et al. disclose the instant claimed invention except for the chip being mounted on a package substrate.

Goodwin discloses an LGA/BGA package assembly (figure 1) having a LGA/BGA package being mounted on a socket (20), wherein the LGA/BGA includes a semiconductor chip (14) being mounted on a package substrate (14, figure 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the package substrate design of Goodwin with the semiconductor package of Cromwell et al., for the purpose of strengthening the package substrate and preventing damage to the semiconductor pins.

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8. Claims 7-11 and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cromwell et al., as modified, as applied to claim 13 above, and further in view of Kehret et al. [US 6,765,793].

Regarding claims 7-11, Cromwell et al. in view of Goodwin disclose the instant claimed invention except for the specific structure of the plastic stiffener.

Kehret et al. disclose a stiffener (figures 2-4), comprising:

- a top plate (240);
- a bottom plate (234) having retaining means for retaining positioning of the stiffener to a package substrate (figures 2-4);
- a serpentine shaped supporting structure (232) sandwiched between the top and bottom plates, wherein the serpentine shaped supporting structure allows for large deformation in thickness of the stiffener while supporting desired pressure (figures 2-4);
- wherein the stiffener is formed of a single pieces of sheet metal (column 6, lines 45-65), as claimed in claim 8;
- wherein the serpentine shaped support structure is a wave shaped structure perpendicular to the top and the bottom plates (figures 2-4), as claimed in claim 9;
- wherein the serpentine shaped support structure is slanted inside to the semiconductor of the package, as claimed in claim 10; and
- wherein the serpentine shaped support structure is formed of ductile material such as copper (column 6, lines 54-66), as claimed in claim 11.

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the specific stiffener design of Kehret et al., for the stiffener of Goodwin in the device of Cromwell et al., for the purpose of strengthening the package and dissipating heat therefrom.

Regarding claim 13, Cromwell et al. disclose the instant claimed invention except for the package assembly including at least one plastic stiffener formed on the top of the package.

Goodwin discloses the package structure (figure 1) having a stiffener (60) being formed on the package structure.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add the stiffener on the top of the package assembly of Cromwell et al., as suggested by Goodwin, for the purpose of strengthening the package structure when the heat sink is mounted on the printed circuit board.

Kehret et al. disclose at least one stiffener can be formed of plastic (column 6, lines 21, 37-41).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use plastic to make the stiffener of Cromwell et al., as modified, as suggested by Kehret et al., for the purpose of reducing weight of the package assembly.

Regarding claim 14, Cromwell et al. disclose the LGA/BGA package being selected from the group consisting of a lidless package.

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Cromwell et al. disclose the instant claimed invention except for the package being selected from the group consisting of a lidded package with a small lid and a lidless package.

Goodwin discloses the LGA/BGA package being selected from the group consisting of a lidded package with a small lid and a lidless package (figure 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the lid design of Goodwin with the LGA/BGA package of Cromwell et al., for the purpose of strengthening the package assembly and providing openings on the package lid to dissipate heat from the package assembly.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Kehley et al. [US 5,919,050] disclose an apparatus for separable interconnecting electronic components;
- Sarkissian et al. [US 6,183,269] disclose termination adaptor for PCB;
- Shirai et al. [US 6,976,888] disclose a LGA socket contact;
- McHugh et al. [US 5,984,693] disclose a contact of an LGA socket;
- Evans [US 6,672,881] discloses a ball grid array;
- Moran [US 6,149,443] discloses a ground connection apparatus;
- Brown et al. [US 6,974,331] disclose a socket connector carrying flexible contacts.

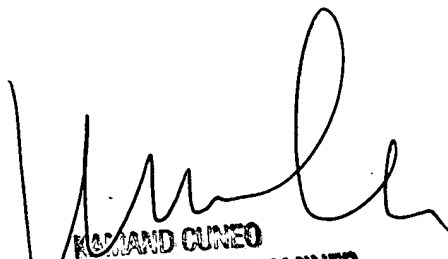
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10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung S. Bui whose telephone number is (571) 272-2102. The examiner can normally be reached on Monday-Friday 8:30AM-6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on (571) 272-1957. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

6/11/06
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Art Unit 2841


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